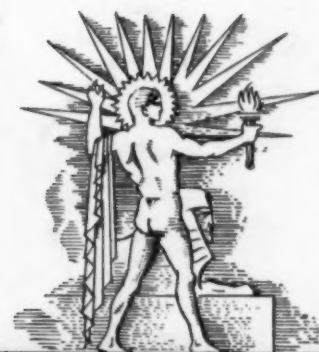


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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



February 19, 1938

Rough Rider

See Page 123

A SCIENCE SERVICE PUBLICATION

Do You Know?

Mexico has set a quota on immigrants to be admitted each year.

This year is the centenary of the great naturalist, John Muir, born in Scotland in 1838.

Ruins of Clarendon Palace, a favorite country seat of medieval English kings, have recently been excavated.

Canned ice, frozen in galvanized iron containers, is produced in some farming areas where water is limited.

Under present production methods only 20 to 50 per cent. of petroleum in most reservoirs is recoverable.

German chemists are trying to get wool from fish, by a process for producing a textile fiber from the albumen.

Gems with star formations in them were once popularly believed to be made from sparks from the Star of Bethlehem.

New strains of seedling corn are given an artificial drought test at Kansas State College, to see how well they withstand heat and dryness.

Making soap from coal is being tried by German chemists—that is, they are turning ordinary coal into synthetic acid fats for soap-making.

A refrigerating machine called a temperature duplicator is being used to study effects of winter injury on apple trees in New England.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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SOCIOLOGY

What country has a higher percentage of early divorces than the U. S.? page 121.

STANDARDS

How can specification purchases benefit the "little fellow"? page 122.

VETERINARY MEDICINE

Why are animal blood transfusions costly? page 118.

A well-built bird house, says a Cornell scientist, is durable, rain-proof, cool and readily accessible for cleaning.

Greek rulers founded at least 16 cities called Antioch, and about 12 more ancient cities were re-named Antioch.

Japan is planning to produce rayon from rice-husks, of which there is an almost unlimited supply.

In marshy farm areas in Germany the peasants shoe their horses, as well as themselves, with wooden clogs.

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METEOROLOGY

Medicine Hat Is Not Cold Wave Factory For U. S.

Winter's Big Freezes Actually Come From Polar Basin;
Canadian Station's Fame Dates From Pioneer Days

By DR. WILLIS R. GREGG
Chief, U. S. Weather Bureau

WE AT THE U. S. Weather Bureau are frequently asked where cold waves come from, and whether Medicine Hat is "the cold wave factory for this country."

Medicine Hat does not deserve that title. The cold wave factory for the United States is farther north than that, in the Polar basin. In former years, before we had reports from the Mackenzie Valley, Medicine Hat was one of the first outposts to feel the cold sweeping down from the north. The weather station there sent warnings, and so it was that Medicine Hat, in western Canada, gained cold wave fame.

Our cold waves do not always take the same path from the north. But the main highway for the cold air masses is from the Polar reservoir southward through the Mackenzie Valley, sometimes only as far south as Minnesota, sometimes nearly to the Gulf of Mexico. Then the cold wave route swings eastward over our southern states.

Express Train Speed

So rapidly does the cold air move, on this transcontinental journey, that it has little chance to warm up—that is why it remains a cold wave. In the cold wave of January, 1936, Chicago was frozen to below zero point at 8 o'clock one Wednesday morning, and by 3 o'clock next morning the zero wave, traveling almost as fast as a railroad train, had struck Washington, D. C.

With the system of reporting maintained by the U. S. Weather Bureau, we can usually give 24 to 36 hours warning of a cold wave's approach. Railroads depend entirely on these warnings, to advise them when to take emergency measures.

They hasten to add extra heat to protect perishable goods, or even delay shipments entirely. Fruit growers would be helpless against disastrously low temperatures without the warnings of weather men. Given a little time to pre-

pare for a freeze, they can hastily warm up their heaters and save acres of fruit.

We have no way of knowing how many lives and how much inconvenience the cold wave warnings save. If we could look into homes where the weather warning is read in the daily newspaper we would find one family bringing in extra wood; another family seeing that cows and horses are warm enough; another rushing around to weather-strip windows or do some other long-delayed job to make the house more comfortable. We would find fishermen deciding not to take their boats out, and sick people being hurried to hospitals, lest they have to make an emergency trip in zero weather—all sorts of experiences, plans changed quickly, because of a single line in the newspaper, "Cold wave coming!"

Weather forecasting, started about 1870, has taken a great deal of terror

and misery out of winter crises. There could be no practical forecasting of weather until our modern means of communication, particularly the telegraph, were invented. The ancient Greeks, in Aristotle's day, established about a thousand stations where observers were to study natural phenomena, including the weather. Aristotle himself wrote an excellent book on meteorology. But lacking the aid of telephone, telegraph, or radio, the Greeks, and all other early weather observers, could not gather weather data fast enough, or speed it to a waiting world fast enough, to establish the valuable science of weather forecasting.

Science News Letter, February 19, 1938

GENERAL SCIENCE

National Research Council Elects New Chairman

DR. ROSS G. HARRISON, Sterling Professor of Biology and director of the Osborn Zoological Laboratory at Yale University, has been elected to the chairmanship of the National Research Council. He succeeds Dr. Ludvig Hektoen, who has been named Executive Director of the National Advisory Cancer Council. Dr. Hektoen has been chairman of the National Research Council since July, 1936.

Science News Letter, February 19, 1938



A BEACH OF DEAD FISH

Hundreds of thousands of menhaden, or "fatback", were piled on the beach at Topsail Inlet, just above Wilmington, N. C., when massed schools of the fish attempted to pass through the shallow strait, in water insufficient to accommodate their huge numbers. Suffocated when the oxygen in the water was exhausted, they died and were piled up by the waves until they covered the beach.

CONSERVATION

Wildlife of North America Discussed at Annual Meeting

Yellowstone Elk, Restoration of Ducks and Deer, Game Enemies, Among Topics at Baltimore Conference

YOU AND YOU, Mr. and Mrs. U. S. Citizen, are part owners of a herd of nearly 10,000 elk, that live in the northern part of Yellowstone National Park. Your hired men, the rangers, count them for you once a year, working on skis and snowshoes, often battling blizzards.

At the Third Annual North American Wildlife Conference, Victor H. Cahalane of the U. S. National Park Service told of the 1937 elk census. Fifteen groups of rangers, working in twos and threes, as nearly as possible at the same time, counted all the elk they could find. Severe weather interfered, but it is felt that the total count of 8,318 does not represent much duplication. However, because of the probability that many were missed, hiding in small bands in thickets, the count was estimated as only 90 per cent complete. The full estimated total comes to 9,673 head of elk.

There is also a southern herd on the other side of the Park and in nearby territory, that is about the same size as the northern herd, or perhaps even larger.

In National Forests

By no means all the elk are concentrated in and near Yellowstone National Park. The U. S. National Forests have a tremendous big-game population. Seventeen of these forests, studied by R. M. DeNio of the U. S. Forest Service, supported a grand total of 109,037 deer and 37,545 elk, according to the 1937 game census.

Examination of the stomach contents of elk shot at various times shows that in December they make an abrupt change in their feeding habits, from grasses to the twigs of shrubs and conifers. In April they go back to feeding on grasses. Deer in general do not depend so heavily on grasses as do elk.

Deer in the forested areas around the Great Lakes are probably as abundant now as they ever will be, Harry E. Adams of the U. S. Forest Service told the conference. Years ago, before the virgin forests were swept away by lum-

bermen, there weren't really very many deer in them. Deer feed mainly on leaves and buds of underbrush, and in the "closed" primeval forest there is little of this.

Then came the wave of steel and fire that cleared away the forests. After it underbrush sprang up thickly in the deforested areas. With this abundant source of food the deer multiplied accordingly.

Now the new forests are improving, beginning to reach maturity, and as they do so the old, looser organization of "pre-climax" vegetations, that had plenty of room for underbrush, gives way gradually to closed stands of trees with all their leaves and buds far up beyond the reach of deer. So the antlered population is bound to diminish.

High Hunting Pressure

This maximum deer population has grown up along with a great increase in human population in the region, and hence with a hundred-fold increase in the hunting pressure on the game. Yet the percentage of success among hunters has remained about the same, said Mr. Adams, about one hunter in every three has continued to get his deer.

North and South have met in the deer population of the Pisgah National Game Preserve in the mountains of western North Carolina, and melting-pot effects are already evident among them. E. A. Schilling of the U. S. Forest Service related the history of the movement.

Before the region was purchased and set aside in 1916 the original deer population had been nearly or altogether wiped out. The former owner, George Vanderbilt, transplanted deer from other parts of the East, notably from Florida and the Adirondack mountains of New York. They were distinct varieties of the same species; the Florida deer were rangy, the New York animals solid and chunky. There were also marked color differences. The deer of the Pisgah now are a thorough-going mixture, intermediate in build and showing several color varieties:

The transplanted and hybridized population is highly successful in its occupation of the country. The census taken in 1916 indicated about 1,000; seventeen years later the count was not much short of 10,000.

Fencerows lined with bushes, small trees, even weeds, were praised as genuine assets to the land by Frank C. Edminster of the U. S. Soil Conservation Service.

Dislike of brushy fencerows started with the belief that they harbored crop pests; as indeed they sometimes do, Mr. Edminster admitted. But even when they do not, they are now considered evidence of bad farming. It has become "fashionable" farming to demand "clean fields."

Profit in Fencerows

Yet those same brushy fencerows offer several very substantial advantages, the speaker pointed out. They aid in holding the soil along field-margins against erosion and gully formation, they shelter birds that aid farmers by eating insects and weed seeds, and they can produce incidental volunteer crops of their own, like berries and fence-posts. Most important of all, they offer shelter to game birds and animals that offer enjoyment, sport, and supplementary food supplies to the landowner.

Drought years such as the West and Midwest have suffered during the present decade are cruelly hard on game birds and animals as well as on crops and livestock, Douglas E. Wade of the University of Wisconsin stated. Game birds of all kinds, except pheasants, were badly reduced in numbers during the 1936 drought.

Many causes may have been set in operation by the drought, besides the obvious one of food and water shortage. The available wild foods may have had their vitamin content reduced, as vitamin C was reduced in tomatoes by the drought. Rodents, driven by starvation, gnawed bark and girdled food plants.

Eggs Cooked by Sun

One undoubted factor was the cooking of eggs by the pitiless sun. Thousands of nests were thus ruined. Pheasants seemed to have wit enough to abandon a batch of dead eggs and start again, but other birds stuck to their nests in futile and tragic loyalty.

Enemies of quail are usually thought of in terms of foxes, rats, occasionally owls. But in the quail territory of the Southeast a species of ant, the fire ant, has to be taken into the reckoning as

an important cause of quail life destruction, reported Bernard V. Travis of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

These ferocious swarming insects attack the eggs as soon as they have been pipped, or the newly hatched quail chicks while they are helpless. They kill from 4 to 16 per cent. of the quail hatch each year.

Predators of the more conventional types, such as foxes and owls, have a greater apparent effect on quail in the Southeast than in the Midwest, it was disclosed in a joint paper by Paul L. Errington of Iowa State College and Herbert L. Stoddard of the Georgia Cooperative Quail Study Association. Smaller numbers of birds and beasts of prey seemed to get more of the quail in the Southeastern region.

Importance of Rats

The investigators did not undertake to present a hard-and-fast explanation, but they suggested a third angle to the problem. In the Southeast, the stock diet of the predators is based on the cotton rat, which is subject to sudden and drastic fluctuations in its numbers. It may well be that at such times the predators, short of cotton-rat meat, may turn to other sources and thereby place very heavy "predation pressure" on the game bird population.

Housing problems are felt as acutely by wild birds as they are by human beings, and one of the immediate responses to anything like a solution is met by birds as it is by the featherless biped population—with an increase in reproduction rate. This was indicated strongly in a report by W. F. Kubichek of the U. S. Biological Survey.

Mr. Kubichek described the measures taken by federal and cooperating workers to restore home conditions to normalcy for both water and upland birds: low dams to refill old ponds and swamps, planting of brush patches for shelter, even the construction of leantos where emergency demanded, planting of patches of food plants.

And the birds came back: "Prairie hens and sharp-tailed grouse have increased tenfold in one year. Waterfowl nesting on federal refuges are exhibiting remarkable annual gains. Other water birds, such as gulls, terns, cormorants, etc., by their invasion of the refuges indicate that the ideal condition is being approached on the federal refuges for all forms of wildlife."

Science News Letter, February 19, 1938



RETURN OF THE PRONGHORN

Once more numerous even than the bison that covered the plains of the West, the pronghorn has come even nearer extinction. Carefully tended by wildlife administrators, they are now showing signs of a comeback.

EUGENICS

Fear of Children Causes Intellectuals' Race Suicide

RECENT research throws the problem of race suicide directly into the lap of psychologists and educators.

Heretofore it has been a widely held idea that Americans of the more intellectual and economically superior classes were not having large families because they were not able to do so. Health conditions, inferior physical constitutions would prevent those living the soft life of wealth from giving birth to large numbers of children or would cause them deliberately to limit the number of offspring, it was reasoned. Somehow, Nature would balance the gift of mental superiority against a biological inferiority. Men would forfeit a high biological survival for a chance at a sort of intellectual posterity.

Actual research has thrown doubt on the theory of lessening fertility. Now a new study conducted by Dr. Paul Popenoe, of the Institute of Family Relations in Los Angeles, leads him to make the direct accusation that more than two-thirds of the childless homes studied in California are so because the might-be parents simply do not want children.

Why don't married people want children?

The chief reason, as determined by confidential questioning (not of the parents themselves, but of close relatives and friends) is selfishness. They do not want

to be bothered. The wife's career is second in importance.

Economic pressure and marital discord are relatively unimportant, eugenics is negligible.

But looming large in influencing both husband and wife is a neurotic fear of childbirth and of the presence of children in the home.

"A striking commentary on present-day education," says Dr. Popenoe of this strange condition in which married adults are actually afraid to bring children of their own into the world.

Science News Letter, February 19, 1938

ASTROPHYSICS

Smithsonian Institution Closes Sinai Observatory

THE SOLAR observatory on Mt. St. Katherine on the Sinai peninsula, between Africa and Asia, operated during the past five years by the Smithsonian Institution, has been closed. The station was established in this historic spot to obtain data on the daily fluctuations in solar radiation. Difficulty in transporting supplies to its summit during the winter was one determining factor in the decision to suspend operations, at least for the present.

Science News Letter, February 19, 1938

VETERINARY MEDICINE

Transfusions For Animals

Methods Used in Giving New Blood to Sick Human Beings Now Adapted for Dogs, Horses, and Other Animals

By LEONARD H. ENGEL

A WINEGLASSFUL of life-giving blood is slowly being forced through the fine-pointed hypodermic needle into the veins of Prince.

Prince, a very sick dog indeed, is already perking up. A slight gleam of life is becoming visible in his glazing eyes. Prince is dying of yellow jaundice, a disease which lays low humans and canines alike. But fresh blood gives him a new lease on life.

Ten minutes, during which youthful Dr. Joseph F. Miller, Washington, D. C., veterinary surgeon, slowly contracts his firm hand to push down the plunger of the needle, are required for the operation. Poor Prince—he hardly bats an eyelash. Not even a quiver when the photographer's flash bulbs flare. He's much too sick.

Four hours earlier Dr. Miller had taken 50 cubic centimeters of blood from a husky, healthy setter brimming with life. He added sodium citrate to the blood to keep it from clotting, made himself ready for the transfusion.

Not New in Medicine

Transferring blood from one individual to another is no new medical story. Doctors have been experimenting with giving blood to the ailing for many centuries. During the last thirty years American surgeons have given blood transfusion the proportions of a mass production industry.

But it is only in the past few years that canine transfusions such as this have become possible. Veterinarians have borrowed from the medical profession and are applying the same life-saving technique to man's best friends, the domestic animals.

Ten years ago a blood transfusion for a human being was still an enormously complicated matter. Blood transfusions for animals were as yet only a wild-eyed suggestion. Today blood transfusion for people has given rise to thousands of professional blood donors, many of them students selling portions of their health to buy an education. To veterinary surgeons, who are seldom far behind the men who save human lives, the new

technique is becoming standard practice and is finding for itself a roseate future.

The blood of animals has almost always been a part of the story of transfusion, one of modern medicine's most spectacular triumphs. In 1654, Francesco Folli, a Florentine physician, transfused blood from one animal to another. Samuel Pepys, the English diarist who seems to have seen just about everything in his day, was one of the witnesses.

Early Errors Costly

Jean Denys of Montpellier about 1667 took some blood from a lamb and injected into the veins of a lad of 15 summers. Others imitated him, but they soon learned to their cost, as we know now, that blood cannot be transfused from one species to another. The technique was indeed of little value until in 1907 Jansky, a Scandinavian scientist, demonstrated that there are four types of human blood and that they don't mix. From Jansky's time dates the beginning of the modern blood transfusion era.

During the World War an army of American doctors "invading" France taught the world how useful "shots of blood" can be. But the apparatus they needed was cumbersome and complicated. "Vets" did not, as a whole, seriously consider adapting the technique for their own use. The years after the war, however, saw the American mechanical mind reduce to simplicity itself the apparatus needed. After all, simple apparatus is an ironbound necessity for work with animals; it is difficult to tell an animal pained by a piercing needle to lie quietly and take its medicine like a good little boy.

No need is there now to sing the praises of the brilliant technique that has saved countless human lives. A human being cannot lose more than a quart of blood without suffering serious consequences; if he loses more than that, he may die as a direct result or his resistance may be so weakened that he is a ready victim to the first disease germ that happens along. Victims of pernicious anemia were aided materially by new

inflows of blood in the days before the liver extract treatment. Seriously ill patients, their blood count lowered by prolonged sickness, are given helpful "lifts" by "shots" of the life-saving fluid. Transfusions still rank high on the list of weapons in the arsenal of the physician fighting blood poisoning, whether it come from a rusty nail in the backyard or the "kiss of death" of a king cobra snake. The same cases apply to animals.

The same year that saw the beginning of the depression saw the University of Pennsylvania's professor of veterinary physiology, R. S. Amadon, tackle the problem.

Dr. Amadon found that the blood of oxen needed no typing. He found also that the "vet" who wishes to pump healthy blood into the circulatory system of a sick horse had better conduct tests in advance to make sure that the bloods would mix. If he didn't he was liable to have the same trouble that cursed the medical fraternity prior to Jansky's experiments: bloods that didn't mix destroyed each other with resulting blood clots and the like, and sometimes, death to the unfortunate individual in whose system occurred the deadly chemical combat.

For Internal Hemorrhage

Uses for the new technique are many and varied, but in general they are similar to the tragic necessities of human accident. Soberly, Dr. Amadon remarks at the conclusion of his most recent paper on the subject:

"It may be stated in closing that although the use of transfusion has been discussed from the standpoint of its application in horse and cattle practice, the same indication exists in small animal practice, especially in canine practice in the urban community where animals are frequently injured by automobiles and suffer severe internal hemorrhage."

Autos and disease both take their toll of the pets the neighborhood's families have accumulated, whether by taking in strays (such as the unfortunate Prince, who just wandered into a farmer's home four and a half years ago) or by purchase. Human medical practice has shown and veterinary experience has confirmed also that transfusion is a valuable treatment in cases of shock from some severe injury.

But, perhaps unfortunately, in the

case of horses and cattle transfusion cannot become a widely-used therapeutic treatment for some little while at least. It's an expensive business and the average cattle-owner is a cattle-owner as a means of making a living, not because he happens to like Bossy. For that reason, before he orders the county animal doctor to force new life into Bossy's sick veins he will sit down and figure the cost: which will cost more: to fix Bossy up or to buy a new Bossy?

Donor Upkeep Expensive

Dr. Miller finds that he has to charge in the neighborhood of \$5 for each transfusion. He points out that he must keep "donor" dogs in his hospital, and that sometimes they may go for two or three months without being called on to supply blood to an ailing member of the species. The big setter that furnished the blood for Prince can eat a small fortune in the form of hamburger and dog biscuit in a couple of months. Donor dogs must be kept in absolutely top-notch physical condition.

Giving blood to a horse, although the direct transfusion method generally used appears to be simple, is in reality a much more complicated affair because of the need for typing the blood right then and there. No Jansky has come forward to type the blood of horses, so each "vet" must make the test for himself when it has been decided that a transfusion is necessary.

Several Horses Needed

Professor Amadon advises the newcomer to the art to have more than one donor horse on hand in case blood from the first donor and the recipient horse are incompatible. First thing the "vet" does when horses, instruments and assistants are ready is to draw a thimbleful of blood each from the horse that needs blood and from those that will give it.

After allowing the specimens to clot, he pours off the liquid serum and adds a little weak salt solution. He shakes it vigorously until the salt solution is bright red from blood cells suspended in it. Thus cells and serum are separated. On a pane of glass he places a row of drops of serum from the horse that will get the blood transfusion.

Into the first drop go a few of the cells from the same blood specimen as a "control." The doctor knows that these cells and serum, at least, will mix satisfactorily; and the appearance of the "smear" gives him a ready means of



NEW LIFE FOR A VERY SICK DOG

Ten minutes were needed to pump in the blood, minutes during which Prince didn't wiggle an ear or a tail once.

checking the behavior of the mixed specimens.

After suitable mixing the doctor looks carefully. The first specimen, a mixture of the recipient's own serum and own blood cells, will be homogeneous. If the donor's cells mix with the recipient's serum, that specimen too will be homogeneous. But if not, it will be granular in appearance. And the "vet" knows that he had better try the next donor. Otherwise instead of having to worry about a sick horse he may have to explain away a dead one to the owner.

A syringe to provide the motive power and six feet of rubber tubing, to allow room for maneuvering the animals, furnish the pipeline highway for the blood. A milk bottleful of salt solution, handy also on your own doctor's instrument table when giving you a transfusion in case of a sudden drop in blood pressure, is kept available.

Horses Easier to Treat

In his sober, scientific language, Dr. Amadon reports that horses are nice and quiet when they are being so treated. But the ox, apparently, doesn't know quite so well what's good for him. "The ox is more resistant to restraint and venous puncture than the horse." Animal doctoring is thus apparently another profession not without its honorable risks. The Pennsylvania scientist, who is a practical farmer as well, recommends stanchions and plenty of room for maneuvering the obstreperous oxen.

The saphenous vein in the hind leg is

often used in giving blood to dogs. A vein in the neck serves as the entrance for new blood into a horse or an ox. Arteries are never used, nor is the "vet" in a hurry about pumping in the life-giving fluid. Loading the blood into the arteries or pumping it in too rapidly is likely to overload the heart that has been weakened by not having enough blood.

Must Watch Pulse

Harking back to the old days of bleeding a person as a preliminary to curing him (sometimes it helped kill the patient, however, as in the case of George Washington), veterinary surgeons sometimes bleed a horse before giving him healthy blood, much the same as one might drain the oil from an automobile crankcase before refilling. But not all the blood is taken out first.

In contrast to human medical practice, in which dosages of blood have been somewhat standardized through long experience, veterinarians have not yet worked out just how much blood a horse should be given for a particular ailment. Instead the animal doctor, at the same time he is squeezing the syringe to pump in blood, is noting the patient's pulse. When it has returned to normal, the doctor knows that the transfusion is complete.

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Science News Letter, February 19, 1938

PALEONTOLOGY

Wrangel Island Mammoth To Be Taken to Moscow

THE CARCASS of a mammoth, recently found whole and frozen in the icy soil of Wrangel Island, is to be removed to Moscow by a special expedition of the Academy of Sciences of the U.S.S.R., it is reported by Tass.

The expedition will move in three parties. The first group, consisting of three scientists, will leave Irkutsk by air for Wrangel island at the beginning of March. They will mount guard over the carcass and begin the excavations and exploration of the island.

The second group will sail in May or June from Vladivostok to the estuary of the Anadyr or Providence bay and from there will reach the island by air. In this party, an expert on permanently frozen soil and a zoologist participating in the expedition will make investigations.

The third group will sail from Vladivostok in a steamer specially equipped for transferring the carcass. It is expected that the ship will reach the island in August.

The carcass will be brought to Vladivostok and stored in a refrigerator. Because of its large size it will probably prove impossible to carry the whole carcass in a railway car to Moscow. In this case the mammoth will be dissected in Vladivostok.

Science News Letter, February 19, 1938

BIOCHEMISTRY

Substances Sought to Pierce "Armor" of Disease Germs

SCIENTISTS of the Biochemical Research Foundation of The Franklin Institute, Philadelphia, are engaged in research seeking to break down the armor-like capsule within which disease bacteria, like those of pneumonia, guard themselves in the body. Dr. J. C. Hoogerheide has been successful in finding bacteria in soil and sewage which accomplish the destruction of the capsule in laboratory tests. The capsule prevents the white cells of the body, the leucocytes, from attacking and killing the disease organism.

The capsule guarding the pneumonia bacteria consists of a form of sugar known technically as a polysaccharide. This sugar-substance, which the bacteria turn into a fortress, also has another bad effect. Some of it apparently courses through the blood stream of the body and neutralizes the antibodies, another

division of the body's germ-fighting forces. Thus treatment by antiserum is also rendered ineffective.

If one can obtain an enzyme which will break down the polysaccharides, therefore, it appears that two beneficial results would be obtained.

The body does not contain the enzyme necessary for this attack on the polysaccharides, notes Dr. Hoogerheide. He has found, however, that certain harmless bacteria from soil and sewage attack the polysaccharides of the pneumonia germ (Types I, II and III).

From pure strains of these soil and sewage bacteria Dr. Hoogerheide hopes to prepare the enzyme solutions. The work is so new that actual experiments on animals or man have not yet been tried.

Science News Letter, February 19, 1938

ARCHAEOLOGY

Early American Industrial Town Made "Bargain" Ware

RUINS of an ancient American trade town, where Indians turned out cheap pottery bowls for traveling salesmen to handle, have been unearthed in the tropics in northeast Honduras, by a Smithsonian-Harvard University joint expedition. The Smithsonian Institution has just issued a report of the expedition, which took place in 1936.

The town unearthed sheds light on industrial life of aboriginal America. Evidence that mass production was tried in those days is found in quantities of broken pottery, some decorated in the "factory" method of stamping the design.

Indian business men of the town lived well, judging by two house floors unearthed by the expedition. The plastered floors were stained red. Fragments of plaster, apparently from walls, show redecoration in successive layers of red, yellow, red, blue-gray, and red.

The town is identified as Naco, visited by Spanish explorers in 1526. Spaniards found it a flourishing place of 2,000 houses and about 10,000 natives, with Aztec traders from Mexico bargaining for goods in the shady city square. Ten years later, Naco was reduced to a pitiable handful of 45 Indians, the rest having been killed, enslaved, or driven into the hills.

The expedition, which has made preliminary exploration of the earth-covered ruins, consisted of Dr. William D. Strong of the Smithsonian, and Alfred Kidder, 2d, and A. J. Drexel Paul, Jr., of the Peabody Museum of Harvard.

Science News Letter, February 19, 1938

IN SCIENCE

PUBLIC HEALTH

Final Report Shows 1937 Was Banner Health Year

AN ALL-TIME record for good health was made in 1937, a final survey just completed shows. The record applies specifically to industrial policyholders of the Metropolitan Life Insurance Company and their dependents, but health conditions among this group of over 17,000,000 men, women and children are generally considered a fair reflection of general health conditions.

The death rate for the insured was over 2 per cent. lower for 1937 than in the previous year. Other signs of good health were the all-time lowest mortality rates for eight different causes of death; typhoid fever, scarlet fever, tuberculosis, chronic nephritis, diseases arising out of pregnancy and childbirth, homicides, burns and railroad accidents.

Science News Letter, February 19, 1938

SAFETY

Drunkenness on Foot Shown Deadlier Than at Wheel

HIGHWAY traffic fatalities have reached staggering proportions in more ways than one.

Not only are the figures representing the annual death toll—more than 37,000—enormous, but drunken pedestrians contributed even more heavily to the total than did intoxicated drivers.

During 1936 a group of 25 states reported that 7 per cent. of all drivers involved in fatal accidents were under the influence of alcohol, while 21 states reveal that of the total of pedestrians figuring in traffic deaths, 11 per cent. were intoxicated or had been drinking.

The trend since 1933 shows that whereas had-been-drinking drivers increased in number by 40 per cent. the drunk walker registered an 83 per cent. gain. One state reports that during 1936 a fifth of all pedestrians killed on its highways had been drinking, and in another state, up to November of last year, 1937 pedestrian fatalities at night involved a drinking walker in one out of every four cases.

Science News Letter, February 19, 1938

CE FIELDS

PUBLIC HEALTH

Fund Honoring Swedish King To Fight Paralyzing Ills

JUST as funds collected upon President Roosevelt's birthdays are being used for combatting infantile paralysis, so the Swedish people are collecting a fund honoring their King Gustavus V which will be used for investigating and fighting the paralyzing maladies, especially infantile paralysis and the rheumatic diseases.

The gift of the Swedish public will be presented to King Gustavus on his eightieth birthday, which occurs on June 16. Its utilization for medical purposes will be in accord with the King's own wish.

Science News Letter, February 19, 1938

GENETICS

Risky To Be Different, Genetics Study Shows

IT'S RISKY to become different, in nature. The penalty of evolutionary change in any direction is usually death for the rash innovator. Only when a mutation happens to meet a friendly combination of environmental factors does the new-type organism survive.

Such was the picture sketched by Prof. Theodosius Dobzhansky of the California Institute of Technology, in a lecture at the Carnegie Institution of Washington.

"The general picture of the mechanism of evolution thus arrived at will certainly be far from pleasing to those who regard nature as an embodiment of kindness," said Prof. Dobzhansky. "I must confess that this picture is not pleasing to me, either. The words 'good' and 'bad' are not to be found, however, in the scientific lexicon. In this lie simultaneously the greatest strength and the greatest weakness of science."

Yet despite the high price a species must pay for evolutionary change, natural species are apparently always ready to play the game. The seeming uniformity and reluctance to change among wild things, as contrasted with the great variability in domestic plants, and ani-

mals, would seem to be more apparent than real.

This Prof. Dobzhansky and other researchers have lately demonstrated strikingly in that small pet animal of geneticists, the fruit fly *Drosophila*. Most of the classic work with this insect has been done on strains that might be called domesticated, carefully raised in laboratory bottles. But one wild species, captured in several different parts of this country, has shown differences in chromosome structure and gene arrangements that are just as definite as those of the laboratory flies.

Science News Letter, February 19, 1938

PUBLIC HEALTH

Half of Average Americans Eat Third-Rate Diet

MANY an American family that would not buy second-hand furniture or wear second-hand clothes is eating a third-rate diet. This is apparent from a survey of typical food expenditures made by Dr. Hazel K. Stiebeling of the U. S. Bureau of Home Economics. The survey included 25,000 representative city, village and rural families.

Size of the family pocket-book was not the only or perhaps even the chief factor responsible for the poor nutritional quality of the family's diet. At every expenditure level above \$100 per person per year, some families were able to provide themselves with very good diets. The reason more families do not get good diets is chiefly because they do not know how to select the most nourishing foods for the money.

As might be expected, the tables of the well-to-do families were more frequently and more liberally supplied with milk, butter, eggs, fruits and green and leafy vegetables. These are classed by nutritionists as the "protective foods" because they protect against such serious ills as rickets, beri-beri and scurvy and also against numerous minor degrees of ill health and under-nutrition. Families spending less than \$85 per year per person for food, as might also be expected, got very poor diets.

At the median expenditure level, however, which is \$130 per person per year, almost one-half were eating a third-rate diet and nearly another fifth a very poor diet. At this expenditure level a little over one-fifth of the families had a first-rate diet.

Three-fourths of the families were at the \$100 or more expenditure level but less than one-third of them were selecting very good diets.

Science News Letter, February 19, 1938

SOCIOLOGY

First Five Married Years Show Worst Divorce Record

THE FIRST five years are the hardest in American married life, judging from divorce figures just compiled by the Metropolitan Life Insurance Company. Over a third of all divorces in the United States—35.7 per cent., to be exact—take place within that period. Lowest percentage of divorces is found during the period between 15 and 20 years after marriage. The exact figure is 8.5 per cent.

The United States leads the 15 leading nations of the world in the ratio of total divorces to marriages and ranks second in percentage of divorces within the first five years. For every 1,000 marriages in 1935 in the United States, there were 164 divorces. Bulgaria tops the list in percentage of early divorces, although its total number of divorces is relatively insignificant.

The high proportion of divorces after a short married period may not be altogether unfortunate, the life insurance officials point out, because the marriages disrupted by early divorces will often be the childless ones or at least will not involve the breaking up of a family with several children.

Science News Letter, February 19, 1938

SEISMOLOGY

Colombian Earthquake Was In Active Seismic Region

THE EARTHQUAKE reported from the Republic of Colombia in press dispatches on Sunday, Feb. 6, occurred at 9:33.6 p. m., E.S.T., on Friday, Feb. 4, seismologists of the U. S. Coast and Geodetic Survey stated after studying records collected telegraphically by Science Service.

Its epicenter was in latitude 6.5 degrees north, longitude 76.5 degrees west. This is a point about 60 miles northeast of the town of Pasto, and about an equal distance from the coast. It is a mountainous region, subject to frequent earthquakes. The shock was severe.

Observatories reporting were those of Georgetown University, Pennsylvania State College, Fordham University, Canisius College, the University of California, Weston College, Williams College, the Dominion Observatory at Ottawa, the Dominion Meteorological Observatory at Victoria, B. C., and the U. S. Coast and Geodetic Survey stations at Honolulu, H. T., and San Juan, P. R.

Science News Letter, February 19, 1938

STANDARDS

Standards are Good for Users And Producers World Over

Large-Scale Purchases Now Made Only by Speculation,
Consumers' Organizations to Help Small Buyer Also

SPECIFICATIONS, standards, for quality, performance and practice—these bind the work-a-day world together, bridging oceans, crossing boundaries. Standards make it possible for any nut to fit any screw thread of that size. They prevent the buying of "a pig in a poke."

Caveat emptor, let the buyer beware, is replaced by specifications and guarantees by the seller that his goods measure up to what is agreed generally is proper weight, size, quality or service. Consumer and producer find specifications and standards are good for business and good for users.

An immense amount of buying is still being done, particularly by individuals and small concerns, without any specifications whatsoever. But it is predicted that all buying agencies in a comparatively short time will purchase only upon some well-known specification.

Scarcely a technical professional or trade organization exists without a committee on standardization. Here buyer and seller meet on grounds of equality. The more important national standards are given the blessing of a federation of societies known as the American Standards Association and world standards are cleared through the International Standards Association.

The consumer, who is individually each of us, has heretofore been inarticulate and at the mercy of the seller. But consumers' associations are remedying that by bringing to their members the same sort of technical advice that great

corporations find profitable in purchasing.

Often more than one group is concerned with standardization. For instance, James H. Herron, consulting engineer of Cleveland, has explained how the singer, piano manufacturer and scientist must work together to standardize musical tone. The manufacturer must set his standards to conform to the range of the human singing voice and yet be compatible with the physical structure of the piano. A singer trained to an instrument of certain pitch may suffer serious strain if required to perform at slightly different pitch. And an increase of only five vibrations per second in the standard A tone with a corresponding change throughout the scale would put an additional strain of about half a ton on the framework of a piano.

Science News Letter, February 19, 1938



LASTING IMPRESSIONS

CHEMISTRY

Long Storage May Lose Important Parts of Food

FOODS kept for years in a "super-normal" granary, if such a policy should be established, would be subject to more than the ordinary expected risks of moth and rust, mice and moldiness, Dr. Frank M. Schertz, Washington, D. C., plant physiologist, points out. The things we used to think of as prime importance in foodstuffs, carbohydrates, fats, and proteins, might be preserved with a minimum of loss, and yet the materials might lose so much of their vitamins and other perishable constituents that the stored masses might in emergency prove a delusion and a snare, filling our stomachs and yet starving us to death.

The idea of a "super-normal" granary was suggested originally by Prof. R. B. Harvey of the University of Minnesota. Prof. Harvey thinks that far wiser than the present national policy of burying a

vast gold reserve in the Kentucky hills would be the accumulation of hoards of food and feedstuffs, textile materials, and other farm and forest products. Prof. Harvey goes Secretary Wallace's ever-normal granary scheme one better, in that he would have it operated in terms of decades rather than mere years.

The hazards of long-time storage of foods are exemplified by Dr. Schertz in a single case, that of carotene, a plant pigment which is also an important vitamin. In fresh green leaf material carotene is present in ratios of only one part to from 6,000 to 20,000 of the total bulk. Yet without this tiny pinch of carotene we perish.

And carotene can not be stored successfully, in the dried state at least, even at low temperatures. Half of it is lost in as little as a month under ordinary storage conditions. Under specially controlled

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conditions the loss can be minimized; but Dr. Schertz has grave doubts of the practicability of maintaining the necessary supply of this and other vitamins in storage lasting many years. He advocates

thorough-going research as a necessary preliminary to any such comprehensive and costly scheme as a "super-normal" granary.

Science News Letter, February 19, 1938

ARCHAEOLOGY

Big Business (B.C.) Invented Writing—Because It Had To

Earliest Bookkeeping Entries Still in Existence Because They Were Written Solidly on Bricks

WHEN man could no longer do without writing, he invented it. Imagine priests in a Mesopotamian city in a busy temple, taking in herds of sheep as offerings, buying lands for the temple estates, making loans to hard-up devotees who can't pay up just now.

It is a science of big business in its earliest form, in the southern Tigris-Euphrates valley over 3000 years before Christ. The growing problem of handling so much wealth has the temple staff dizzy remembering who paid, how much, what is promised, what is due—Writing has to be invented. And so, it is.

Archaeologists have been able to trace writing back to its start in these cities of Sumerian people in southern Mesopotamia, because buried in the ruins are hard, baked clay bricks inscribed with temple accounts. The oldest writing preserved in the world is baked into the oldest and crudest of these tablets of clay.

Whether these Sumerians were the world's first literate people may never be known. Other ancient peoples who had writing systems apparently began by using less durable writing materials, and their early efforts have not survived.

Writing was a city man's invention, in Sumeria. It was the development of city life that brought so much complicated finance to the temples.

That the invention of writing was probably inspired everywhere by the peculiar, practical needs of urban economy, is the view taken by Dr. V. Gordon Childe, professor of prehistoric archaeology at the University of Edinburgh.

It is no accident, he explains, that the world's oldest writings turn out to be bookkeeping accounts and dictionaries. The accounts are office files. The dictionaries are schoolbooks used in teaching

young scribes to write. And if Egypt's earliest writing had been preserved, it would, he believes, be of some such severely practical nature.

Not only were these early entries carefully made; they have been permanently preserved. Almost everything Babylonian scribes ever wrote is still in existence.

That is one of the real wonders from the ancient world. And it is true, not only of Babylonians, but also of Persians, Assyrians, and other civilizations that used clay bricks for stationery.

It is not easy to visualize, in this day of flimsy paper and incinerators, that every clay letter, read and thrown away, is buried somewhere. Every legal document, every book on science, religious psalm, and political treaty entrusted to clay is there, buried deep, perhaps, but waiting to be dug out and read.

All this has been realized only since archaeologists began exploring the Near East. Even modern scholars are vastly impressed, as full implications of the situation become evident.

Dr. George Cameron, of the Oriental Institute of the University of Chicago, speaking at a meeting of the American Institute for Persian Art and Archaeology, said:

"Who would have believed as few as ten years ago that 29,000 tablets—and more—would be discovered in Iran, all from one site, Persepolis, and belonging to one or two short generations of mankind?"

One serious difficulty besets the scholars striving to read this mass of writing. Many of the clay bricks were badly broken when library shelves collapsed in ancient wars and earthquakes. But even this fails to depress workers like Dr. Cameron, who reason that, if an epic or other writing was significant enough, copies were made in many cities.

In time, he cheerfully predicts, the im-



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portant literature will be pieced together. Already, it is surprising to realize that we know more about daily life in a Babylonian city than life in Athens.

Science News Letter, February 19, 1938

ARCHAEOLOGY

Real Tough Rough Riders Were Sumerian Charioteers

See Front Cover

STRONG though the temptation is to call the bearded charioteer pictured on the front cover "Ben Hur of Ur", it would not be quite accurate to do so. For the little statuette comes not from the famous Chaldean city but was dug up at Tell Agrab, near Baghdad. Probably, though, Ur's warriors drove to battle in just such jolting war-chariots behind teams of four scampering donkeys.

Notable are the big copper studs that circled the wheels, tire fashion, and the driver's not-too-comfortable position astride a continuation rearward of the chariot pole. It is to be noticed especially that he is shown standing on the floor of the chariot—he probably didn't sit down much.

This interesting find, which dates from about 2800 B. C., was made by an expedition of the Oriental Institute of the University of Chicago.

Science News Letter, February 19, 1938

PHYSICS

Is Search for Neutrino Vain? Particle Proves Elusive

Possibility That "X" Particle May Not Even Exist Causes Friendly Controversy Among Physicists

DISCOVERY last year of the new "X" particle in atomic physics, which has a mass intermediate between that of the electron and the proton or core of the hydrogen atom, has started scientific investigation out of which has grown an interesting and friendly scientific controversy. Scientists are wondering if the elusive neutrino particle, postulated by theory but as yet unfound, will ever be discovered.

Handy in Explanation

The neutrino—a non-charged particle without mass—has been suggested to explain theoretical aspects of atomic physics where small discrepancies in energy were needed. It was convenient to have neutrinos around in this case so that the energy in transmutation experiments would balance before and after the experiments. Otherwise the physicists would have had to admit that the conservation of energy no longer held true; a long-held and time-tried concept which they hated greatly to discard.

When the "X" particle was discovered, with a mass 130 times that of the electron and then later with a mass 350 times that of the electron, a preliminary suggestion was that it might consist of an electron bound with a sufficient number of neutrinos to make up the observed mass. This suggestion did not

"take" well with most physicists, so alternative explanations of the mass of the "X" particle were brought forth.

Prof. G. E. M. Jauncey of Washington University, St. Louis, for example, suggested that the apparently variable mass of the "X" particle came about because it was created from the energy of a photon of cosmic radiation. Part of this enormous energy, he said, was used to give the impacted electron velocity and energy of motion and some of it was turned into increased mass of the electron. This explanation needed no neutrinos to give the observed particle its mass.

With this idea as a starting point, Prof. Jauncey has gone on to suggest that perhaps heavy particles other than the "X" particle or so-called heavy electron might be created by a similar process.

Beta Ray Spectrum

In particular, Prof. Jauncey set out to find a new explanation for the long-puzzling matter of the continuous beta ray spectrum observed when radioactive elements disintegrate. Beta rays, of course, are another name for electrons. A continuous beta ray spectrum means that the electrons liberated from radioactive elements travel varying distances through the air as they are liberated. They do this apparently for all distances

up to some upper limit beyond which they will not go.

Because atomic physics has had such good success with quantum theory, which postulates that energies are not liberated or absorbed continuously but in discrete stages called quanta, it has been most difficult, theoretically, to figure out how the liberated beta rays showed such a continuous spectrum.

Prof. Jauncey now explains this well-known observation by suggesting that all the beta rays emitted from a particular radioactive disintegration have the same energy and that their different distances of travel through the air come about because they have different masses, and different velocities of liberation. The basic factor is that the product of mass of the beta ray times the velocity must be a constant so that heavy mass goes with low velocity (and short range) and vice versa.

Failed to Confirm

With this suggestion of Prof. Jauncey's comes the good-natured and friendly scientific controversy that is now going on in the staid pages of the highly technical *Physical Review*.

From the University of North Carolina comes the report of Prof. Arthur Ruark and his research assistant, Creighton C. Jones, that studies of experiments performed by Dr. F. C. Champion of Cambridge University, England, fail to disclose the experimental findings that should be made if Prof. Jauncey is correct in his theories about "heavy" particles.

In an interview with a Science Service correspondent at the University, Prof. Ruark said the work "definitely disposes of" Prof. Jauncey's suggestions. Further experiments are being performed, however, "to make the matter doubly sure."

"It is known that when beta particles, or electrons, come out from the atoms of radioactive materials, many of them have very high energy, and many others have much less energy," said Dr. Ruark in discussing the experiments. "There are excellent grounds for believing that in every case the atom gives up the same amount of energy, so if the electron does not carry it away, it must escape from the atom in some form which has not yet been detected."

In a letter to the editor of the *Physical Review*, side by side with one from Prof. Jauncey, Prof. Ruark and Mr. Jones state that for a specific kind of radioactive disintegration—that from Radium E—Prof. Jauncey's theory predicts a greater value than is actually observed

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for the energy of beta ray emission. "These results," they say in their journal report, "constitute a definite disproof of the hypothesis of heavy beta-particles."

Their analysis of the work of Champion say Prof. Ruark and Mr. Jones, "have no bearing on the possibility that the heavy particles reported in cosmic-

ray experiments are electrons of exceptional rest mass."

What they are questioning is the correctness of applying a hypothesis for cosmic ray energies of a billion and more electron-volts to the lesser degree of energy that exists in radioactive disintegrations.

Science News Letter, February 19, 1938

EUGENICS

Sterilization Would Not Wipe Out Mental Disease

STERILIZATION of the mentally abnormal would not abolish mental disease, Dr. James Page of the University of Rochester and Dr. Carney Landis of the New York Psychiatric Institute have concluded after a study of conditions in Europe and the United States. It would not even greatly reduce the future incidence, they believe.

The difficulty with a sterilization program, these scientists say, is that less than half the patients admitted to mental hospitals are suffering from mental diseases that are hereditary. Most of those who do inherit their illnesses are the children of parents who were latent carriers of the disease but themselves outwardly normal and therefore not touched by sterilization programs.

Denial that the present complexity of life has resulted in any alarming increase in mental disease is made by these investigators. The increase in both America and Europe has been slight, they said. In New York, the moderate increase that has occurred is primarily among old people.

Science News Letter, February 19, 1938

A case of leprosy that developed 43 years after exposure to the disease has been discovered in Scotland.

A LONG BLAST

No lives were lost, not even of civilians, when this blast was loosed, for the prosaic purpose of digging a ditch under water in the Susquehanna river for the laying of a pipe line. The picture was made by Du Pont Company photographers while the explosion was literally at its height.

MEDICINE

Know Arthritis Type Before Pulling Teeth, Dentist Warns

THE VEXING and much disputed question of whether or not to pull teeth in treating arthritis or rheumatism, to call it by its old-fashioned name, depends to some extent on the type of arthritis in any given case. This is the opinion of Dr. George F. O'Brien of Loyola University School of Medicine.

If the patient has osteo-arthritis, infection is not a factor and the dentist's job, Dr. O'Brien thinks, is one of preservation. The patient's "chewing capacity" must be preserved or improved. Wholesale removal of teeth will not benefit him, since his nutrition will suffer and anything that interferes with his general condition will aggravate the arthritis. It seems to Dr. O'Brien far more logical to do constructive dental work, if at all possible, than to risk the immediate shock or the malnutrition and other effects that may result later from the patient's inability to manage plates and false teeth if his own are removed.

For the type of arthritis known to physicians as non-specific infectious arthritis, the question of pulling teeth depends on whether the physician and

dentist believe teeth can be a focus of the infection that is causing the arthritis.

The chief battleground is the pulpless tooth that shows no signs of trouble in X-ray pictures. These teeth may give trouble even if the X-ray does not show anything suspicious, and even if not infected at the time of examination, they may become so later. If physician and dentist agree that such teeth are possible sources of danger, there seems no reason, Dr. O'Brien believes, for pulling only one such tooth and leaving the rest in.

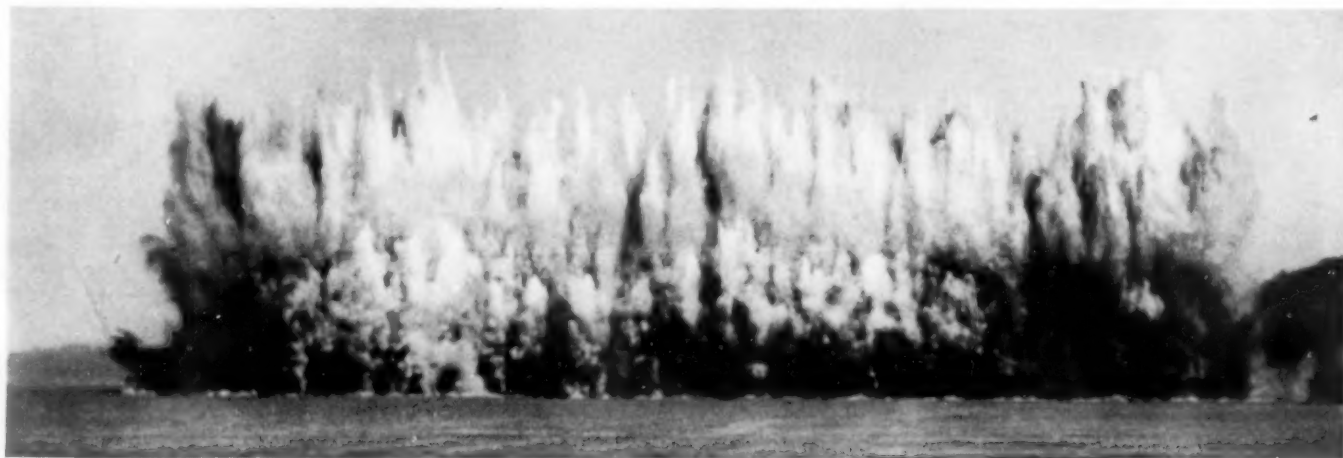
There is also little point, in Dr. O'Brien's opinion, in removing teeth if other foci of infection, such as in tonsils and certain glands, are not removed.

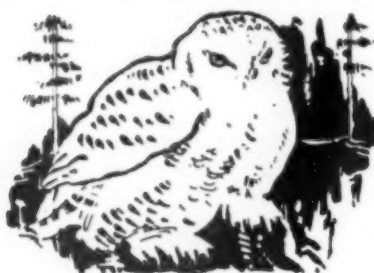
Science News Letter, February 19, 1938

There are about four earthquakes a day in Japan.

It takes a human being's eyes about 25 years to complete their development.

Ancient Rome, like modern Italy, had its youth organization of boys who paraded in military style.





Winter Usefulness

BIRDS, we are apt to take for granted without thinking particularly about it, are especially active and useful to us in summer. There is no doubt there are more of them then, searching trees and bushes for caterpillars, swooping on flying insects in the air.

Yet a really pretty defensible case can be put up for the greater usefulness, per individual, of winter birds. Their population in woods and fields is smaller than in summer, but by the same token the number of hibernating larval and adult insects and other pests is smaller, so that every cocoon destroyed counts a lot more. In the summer a spate of birds feasts on a spate of insects, which replaces itself as fast as it is destroyed.

Winter birds have to make a sharper search in their more scantily-stocked larders, so they are more apt to make a good clean-up of twigs, bark crevices, and anywhere else they find edible tidbits asleep. The same is true for the vegetarian species: they take a larger percentage of the total available weed seeds than do the summer birds, which have plenty of vegetable food.

Especially valuable to man are the winter activities of predatory birds, particularly owls. These feed largely, some-

times almost entirely, on mice and other small rodents. And their winter attacks come at just the time when next year's breeding stock is at its minimum, so that every additional mouse swooped off the moonlit snow means a couple of score fewer mice next harvest-time.

Hawks, too, deserve better than they receive from the shotguns of indiscriminating humans. To very many persons, any hawk is ipso facto a "chicken hawk." But it would be much more accurate to refer to most of them as rabbit hawks, or even mouse hawks,

especially in winter. Even the despised crow takes occasional toll of rodent life.

While the owls and hawks ask nothing of man in winter, except that he restrain his too-ready trigger finger, it is a most wholesome thought to befriend the smaller birds. When storms are severe and snow is deep, hunting for cocoons and caterpillars is not good and starvation threatens. Then is the time when a piece of suet nailed to a limb, or grain and crumbs placed in a feeding tray, will keep some of your best friends in business.

Science News Letter, February 19, 1938

CHEMISTRY

Chemistry, Research Built Quarter of U. S. Industry

ALMOST a fourth of all industry in the United States is chemical—\$10,492,753,000 out of the \$45,759,763,000 produced industrially in a year.

Dollars tell the same story as a look around us at the multitude of things that we use everyday in our complex lives.

Chemical products serve the fundamental human needs of food, clothing, shelter, health, transportation and security. Chemistry takes raw materials from air, farm, forest, mine and sea and makes dyes and organic chemicals, heavy chemicals, drugs and pharmaceuticals, explosives and electrochemicals. The so-called "process" industries convert raw materials into ceramics and glass, coke, fertilizers, leather, lime, and cement, manufactured gas, medicines and cosmetics, oils and fats, paint and varnish, paper and pulp, petroleum, rayon and plastics, rubber, soap, sugar, and textiles. Such a list runs the gamut of material desires and uses.

"Broadly speaking, chemical industry is a great factory that takes the raw materials of nature and by means of chemical processes converts them into useful products to serve our human needs." That is the definition concocted by the editors of Chemical and Metallurgical Engineering, the technical journal, who have just compiled the facts and figures of this inclusive, gigantic industry.

Research has made chemistry. And chemical industries continue research to tune of \$20,000,000 annually spent by chemical manufacturers and several times that amount by the process industries.

Research has lowered prices: "Before research one pound of iodine cost \$4.50,

after research \$1.30; one ampule of salvarsan before research cost \$3.50 a dose, after research 20 cents a dose."

Research has improved products: "In 1910 an automobile tire costing \$50 produced 5,000 miles; in 1936 a tire costing \$15 will give 20,000 miles; the estimated annual savings to American motorists due to research, \$3,002,580,000."

Research has created new industries: "The production of synthetic resins in 1934 was over 100 million pounds, as compared with around 8 million pounds in 1924."

Science News Letter, February 19, 1938

DENTISTRY

New Dental Filling Hardens Like Concrete

A NEW dental filling that works like the concrete used for building underwater structures in that it requires the presence of moisture in order to harden, has been developed in Germany.

Saliva is a hardening agent for the new cement, which is colorless and, it is claimed, does not injure the pulp or the nerve of the tooth. The saliva causes no further change in the cement once it has hardened.

Science News Letter, February 19, 1938

● RADIO

Feb. 24, 4:00 p. m., E.S.T.
NEWS ABOUT HELIUM—R. A. Cattell of the U. S. Bureau of Mines.

March 3, 4:00 p. m., E.S.T.
INDIAN PICTURE WRITING—Julian Steward of the U. S. National Museum.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

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ENGINEERING

Radiant Heating Makes High Room Temperature Unnecessary

People Found to be Comfortable in Cold Rooms When Radiating Wall Panels Prevented Losses of Body Heat

A RADICALLY different approach to controlling human comfort, which has marked advantages over air conditioning, was presented before the recent New York meeting of the American Society of Heating and Ventilating Engineers.

Drs. C. A. Mills and Cordelia Ogle of the laboratories of experimental medicine at the University of Cincinnati presented their preliminary findings on the control of loss of body heat by the use of heated (or cooled) areas in the walls of rooms. The use of these panels, which can radiate heat to the clothing in cold weather or absorb heat from the clothing in hot weather, permits human comfort without the necessity of cooling or heating great masses of air, and the walls of the room, as is now done in air conditioning.

Earlier Experiments

The general principle underlying the thermal panel system is not new; it was in use even in antiquity, and modern use, based on careful engineering research, has been made of it in Great Britain. The experiments of the Cincinnati doctors extend and verify these results.

Although the findings are only preliminary, the physicians say, "these results appear to be striking and unequivocal in their significance, so much so that their early publication was deemed advisable in order that other investigators might aid in expanding this line of research."

"Air conditioning would seem to be highly inefficient as a method of controlling body heat loss," say the scientists. Present methods, they point out, require that great masses of air and whole walls of rooms be cooled or heated in order that the body may be comfortable.

Moreover, sharp contrasts in temperature must be maintained with present systems. In winter a person leaves a room at 75 degrees to go to low outdoor temperatures. And in summer one leaves the outdoors with temperatures up to 100 degrees and enters a room air conditioned to 80 or 85 degrees. These sharp contrasts, state the physicians, can be

suspected of increasing infections of a respiratory nature.

Four experimental rooms were built for the investigation. Room 1 was kept hot and moist (temperature 90 degrees Fahrenheit and humidity 65 per cent), Room 2 had the same temperature and humidity conditions as room 1 but was lined with thin aluminum foil and contained six areas that could be cooled to a temperature in the 30's.

Room 3 contained air at 32 degrees but had panels in the walls which could supply radiant heat to the clothing on the body. With the cold air and the heating units operating an equilibrium temperature of 70 to 76 was maintained in this room.

Room 4 was identical with room three except that there were no heating or cooling areas, the temperature of 66 to 70 being maintained by air conditioning without radiation control.

The hot, sticky nature of room 1 was what might be expected in its semi-tropical artificial climate. Persons found the room produced free perspiration and a discomforting, smothering sensation.

Some Felt Too Cool

Room 2, with its cooling areas, provided an interesting case. The air in the room and the humidity were the same as in room 1 but the presence of the cold areas permitted the body heat to be radiated to these "thermal sinks," as scientists call them, and left the subject in the room without the smothering feeling and without free perspiration. In fact, some persons who worked in the room for some hours found it necessary to cover part of the cold plates to prevent chilling. Another person had to wear a sweater in the room despite its temperature of 90 degrees and a humidity of 65 per cent!

In room 3, where the incoming air was cooled to 32 degrees, severe chilling occurred without the radiant heating from the plates.

However, within a few minutes after the heating panels were turned on, people in the room were quite comfortable even though the air temperature was around

40 degrees and the exhaled breath was visible as it is on a cold day. After some weeks of this mixture of chilled air and radiant heating this room became uncomfortably warm for a person after a half hour even though its temperature was only 70 to 76 degrees.

In room 4 subjects were cool but comfortable when dressed in usual indoor winter clothing.

The significant finding of the research, said the scientists, is that the control of the liberation of heat by the body appears to be the deciding factor in human comfort. That explained the equal comfort in the two rooms, one very cold but with radiant heating and the other very warm but with radiant cooling.

Clothing Slows Chilling

"Clothing materials rapidly radiate their heat to cold surfaces," report the scientists, "and fall to temperature levels well below those of surrounding hot air, thus encasing the body in a cooled capsule to which it can readily lose its internal heat. And in cold air, clothing readily absorbs radiant heat and forms a warm envelope around the body to slow the process of heat loss from the skin."

It is the temperature of the air surrounding the body (inside the clothing) which determines the body's comfort. One can achieve such comfort by heating all the air in rooms and the walls but the new report shows that the same comfort can be obtained without using this rather inefficient process.

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ARCHAEOLOGY

Unwalled Ancient Cities Evidence of Peaceful Ways

PROFOUND peace must have reigned over the highly civilized cities in the Indus valley in India 5,500 years ago. Thus reasons Prof. Walter von Brunn of the University of Leipzig, from the fact that Mohenjo-daro, Chanhu-daro, and other sites have no walls or other fortifications. In this they contrast strongly with most other cities of the ancient Near East, which were constantly at war with each other and belted themselves with thick, high walls.

The peace they presumably enjoyed was reflected in their great prosperity. All the dwellings were built of well-burned brick, and there was a sewer system equal to that of Pompeii and other cities of the Roman Empire 1,500 years later. Today the inhabitants of the same region live in mud huts.

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•First Glances at New Books

Meteorology

THE WEATHER AND CLOUDS OF MANILA—Rev. Charles E. Deppermann, S. J.—Bureau of Printing, Manila, 37 p., 2 pesos. Father Deppermann has combined a brief but scholarly treatise in this subject with so many really beautifully made photographs of cloud forms that his book appeals equally strongly to both the meteorologist and the layman with a sense of beauty. Many of the cloud forms he portrays are familiar enough in our higher latitudes; some, however, appear to be peculiar to the tropics. Especially striking, and of historical interest, is one plate of a cirrostratus halo which was taken as a good omen by the Sakdalistas in their abortive insurrection of May, 1935.

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Library Science

PUBLIC DOCUMENTS . . . WITH ARCHIVES AND LIBRARIES—Jerome K. Wilcox and A. F. Kuhlman, eds.—*Amer. Library Assn.*, 305 p., \$3.25. A valuable collection of the papers presented at the 1937 conference of the American Library Association, dealing with the problems of those papers and reports that originate in our local, state and national governments and also the relatively new and expanding profession of archivist.

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Gardening

MODERN DAHLIAS—J. Louis Roberts—Doubleday, Doran, 211 p., illus., \$2. Somewhat sparingly illustrated, this book offsets the lack by being well packed with information about dahlias and especially with practical directions for their cultivation and care. Follow its advice and you will have plenty of colored pictures—from your garden.

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Whaling

ARCTIC HARPOONER: A VOYAGE ON THE SCHOONER ABBIE BRADFORD, 1878-1879—Robert Ferguson, ed. by Leslie Dalrymple Stair—Univ. of Pennsylvania Press, 216 p., illus., \$2. Whaling stories, simply told, by a whaler. This book will interest the average reader, and fascinate those who still retain a love of adventure.

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Economics

STUDIES IN INCOME AND WEALTH, Vol. 1—Conference on Research in National Income and Wealth—National Bur. of Econ. Research, 348 p., \$2.50. A broad

study by a group of experts from a large variety of organizations which will be of real value to anyone who is concerned with the financial problems of the world in which we live.

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Anthropology

INTERNATIONAL DIRECTORY OF ANTHROPOLOGISTS—National Research Council, 303 p., \$1. Names and biographies of some 1900 anthropologists are here listed, by countries, for the first time, in an international directory of anthropology. Valuable though it is in its present form, the foreword specifies that it is intended only as a preliminary listing, and appeals to the scientific public everywhere to send in corrections, and (especially) names of anthropologists not now included.

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Public Hygiene

REINIGUNGS-INGENIEUR UND -HYGIENIKER—Bimonthly—Pub. at Biskupská 6, Prague, Czechoslovakia, 20 kc. A new professional journal, in German, intended primarily for the medical and public-health professions, and for administrators having to deal with problems in hygiene and sanitation.

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Psychology

THE BASIS OF PERTINENCE: A STUDY OF THE TEST PERFORMANCE OF AMENTS, DEMENTS AND NORMAL CHILDREN OF THE SAME MENTAL AGE—Mary Marjorie Bolles—*Archives of Psychology*, 51 p., \$1. The uninformed observer can easily note a difference between a normal child of, say six years mental age and a defective adult of the same mental level. This study analyzes scientifically what these differences are.

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Education

ADULT EDUCATION, A DYNAMIC FOR DEMOCRACY—Dorothy Hewitt and Kirtley F. Mather—Appleton-Century, 193 p., \$1.75. This is a book from the Boston Center for Adult Education describing the interests of adults and how adult education can be made to appeal to the public.

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Mathematics

PRINCIPLES OF MATHEMATICS—Bertrand Russell—Norton, 534 p., \$5.

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Medicine

THE MAYO CLINIC (Rev. ed.)—Lucy Wilder—Harcourt, Brace, 96 p., \$1.50. This is an authentic, up-to-date account of the Mayo Clinic, telling the story of its founding and growth and giving in detail the experience of a typical patient who "goes through the Clinic." Included in the book is a letter from Dr. William J. Mayo to the University of Minnesota which sets forth the philosophy and ideals of himself, his famous brother, and their father. Amusing drawings by Ruth Barney help to give the reader a true picture of the spirit and atmosphere of the Clinic and the town it has made world-famous.

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Medicine

MILESTONES IN MEDICINE—James Alexander Miller—D. Appleton-Century, 276 p., \$2. Lectures presented to lay audiences at the New York Academy of Medicine in 1936 and 1937 are published in this volume. The lectures were given by men who are not only medical authorities but who know how to write clearly and vividly. As the title indicates, the subjects of the lectures were treated from the historical viewpoint. Psychiatry, heredity, medicine on the old sailing vessels, ductless glands and leprosy are among the topics discussed.

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Medicine

MEDICAL MAGIC—David Dietz—Dodd, Mead, 380 p., illus., \$3.50. As the title indicates, this is a highly readable account of the more dramatic aspects of modern medicine. The author takes his readers into operating room, delivery room and laboratory and gives a short, vivid picture of what goes on in each.

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Physiology

LES GLOMUS NEURO-VASCULAIRES—Pierre Masson—Hermann et Cie., Paris, 44 p., 20 fr.

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Physiology

LE GLUTATHION—Léon Binet and Georges Weller—Hermann et Cie., Paris, 89 p., 20 fr.

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Physiology

L'INNERVATION DE LA GLANDE PITUITAIRE—Remy Collin—Hermann et Cie., Paris, 92 p., 20 fr.

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